CLAIMS

What is claimed is:

1. A method of applying therapeutic ultrasound to a location within a body, comprising: activating a transducer to produce ultrasound at a pulse repetition period of $T \leq 1000$ milliseconds and directing this ultrasound to a location within a body.

2. The method of claim 1, wherein the ultrasound is directed to a location within the body in an invasive manner, with an ultrasound device which is inserted into the body.

3. The method of claim 1, wherein the ultrasound is directed to a location within the body with a non-invasive ultrasound producing device.

4. The method of claim 2, wherein T = about 1 millisecond to 1000 milliseconds.

5. The method of claim 3, the transducer is operated to produce ultrasound at a frequency of about 100 to 1000 KHz.

6. The method of claim 5 wherein T = about 1 to 100 milliseconds.

7. The method of claim 3 wherein T = about 2.5 to 90 milliseconds.

8. The method of claim 5 wherein T = 2.5 to 75 milliseconds.

9. The method of claim 3, wherein τ = about 0.01 to 2.0 milliseconds.

10. The method of claim 3, wherein τ = about 0.02 to 1.1 milliseconds.

11. The method of claim 3, wherein $\tau = 0.1$ to 0.3 milliseconds.

12. The method of claim 9, wherein the transducer is producing ultrasound at a frequency of about 100 to 1000 KHz.

13. The method of claim 3, wherein the intensity of the ultrasound applied is $I \geq$ about 750 W/cm^2.

14. The method of claim 6, wherein the intensity of the ultrasound applied is $I \geq$ about 750 W/cm^2.

15. The method of claim 9, wherein the intensity of the ultrasound applied is I ≥ about 750 W/cm^2 .

16. The method of claim 12, wherein the intensity of the ultrasound applied is I ≥ about 750 W/cm^2 .

17. The method of claim 13, wherein the transducer produces ultrasound at a pulse duration of $\tau \leq 100$ milliseconds.

18. The method of claim 1, including the steps of initiating cavitation within the body by applying a first amount of power to the transducer, initiating cavitation at the location within the body, then reducing the power supplied, while maintaining cavitation.

19. A method of applying therapeutic ultrasound to a location within a body, comprising: producing ultrasound with a pulse duration of $\tau \leq 100$ milliseconds and transmitting the ultrasound to a location within a body via a transmission member which is at least partially inserted into the body

20. The method of claim 19, wherein the frequency of the ultrasound produced is about 20 to 100 KHz.

21. The method of claim 19, wherein the pulse repetition period T ≤ about 1000 milliseconds.

22. The method of claim 21, wherein T is about 100 to 500 milliseconds.

23. The method of claim 19, wherein τ is about 20-60 milliseconds.

24. The method of claim 20, wherein τ is about 10-100 milliseconds.

25. The method of claim 22, wherein τ is about 10-100 milliseconds.

26. The method of claim 25, wherein the frequency of the ultrasound produced is about 20 100 KHz

27. The method of claim 19, wherein the ultrasound is produced with a transducer operated at a peak power output of 10 to 40 watts.

28. The method of claim 22, wherein the ultrasound is produced with a transducer operated at a peak power output of 10 to 40 watts.

29. The method of claim 25, wherein the ultrasound is produced with a transducer operated at a peak power output of 10 to 40 watts.

30. The method of claim 27, wherein the peak power output is about 15 to 30 watts.

31. The method of claim 23, wherein the peak power output is about 15 to 30 watts.

32. The method of claim 23, wherein substantially no cooling fluid is pumped around the transmission member.

33. The method of claim 19, wherein the device is operated at a duty ratio T/τ about ≥ 5.

34. The method of claim 19, wherein the device is operated at a duty ratio T/τ about ≥ 8.

35. The method of claim 3, wherein the device is operated at a duty ratio of about ≥ 5.

36. The method of claim 3, wherein the device is operated at a duty ratio of about ≥ 8.

37. The method of claim 19, wherein the transmission member is located within a guide catheter and is substantially unsheathed within the guide catheter.

38. A system for delivering ultrasound energy into a body, comprising:

a signal generator, a transducer coupled to the signal generator and a transmission member coupled to the transducer;

the signal generator, transducer and transmission member constructed and arranged to transmit ultrasound produced by the transducer to a location within the body by inserting at least a first portion of the transmission member into the body, the transmission member including substantially no sheathing for the transportation of cooling fluid around the first portion of the transmission member.

39. The system of claim 38, wherein the signal generator, transducer and transmission members are constructed and arranged to deliver ultrasound energy to the coronary artery at a peak power output of over 10 watts.

40. The system of claim 38 including a sound detection device capable of detecting cavitation within the body caused by energy transmitted via the transmission member and displaying the presence of the detected cavitation.

41. A system for delivering ultrasound energy into a body, comprising:

a signal generator, a transducer coupled to the signal generator and a transmission member coupled to the transducer; the signal generator, transducer and transmission member constructed and arranged to transmit ultrasound to a location within the body by inserting at least a portion of the transmission member into the body; and

a sound detection device and a display therefore capable of detecting the sound caused by cavitation within the body generated by ultrasound transmitted via the transmission member and displaying the presence of sound caused by the presence of cavitation.

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